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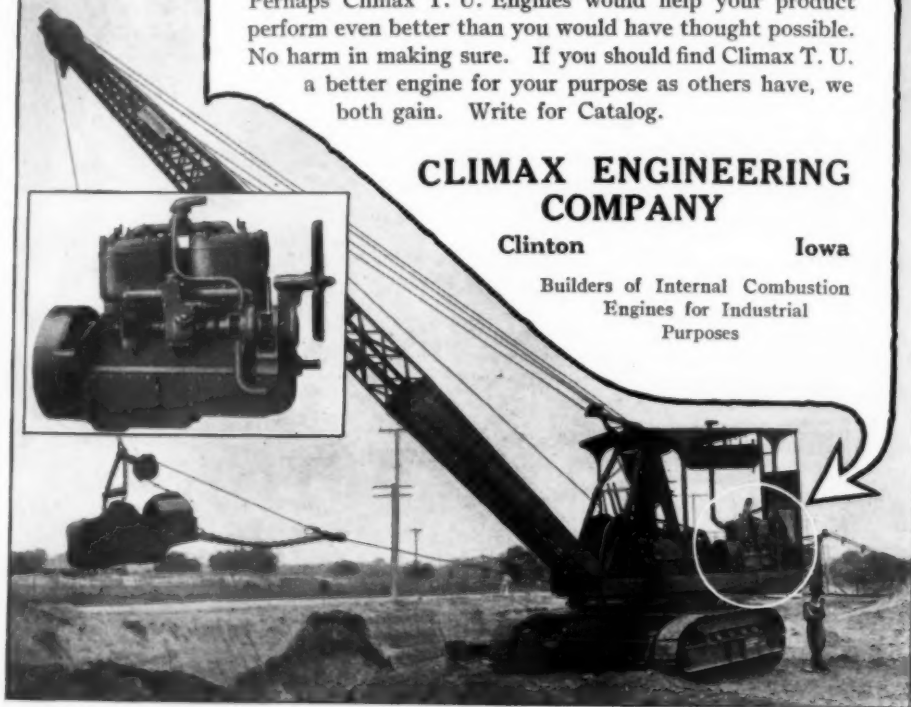
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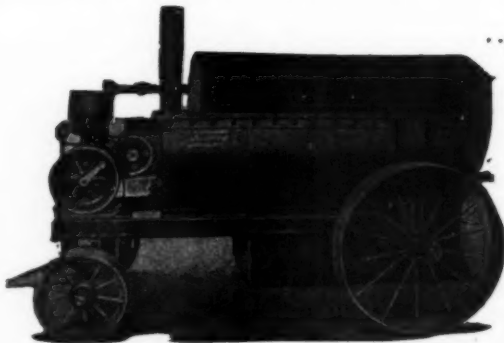


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See pages 78-89

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—the lightest jack made for its capacity. Weighs considerably less than other jacks of equal power, in some sizes less than half as much.

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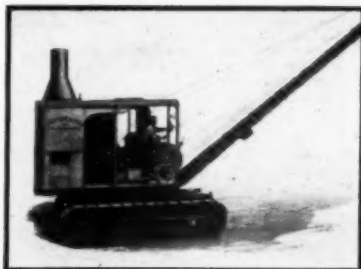
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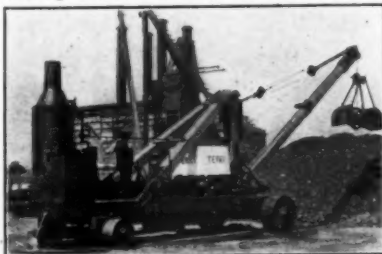
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Marion Steam Shovel Co., Marion, O.
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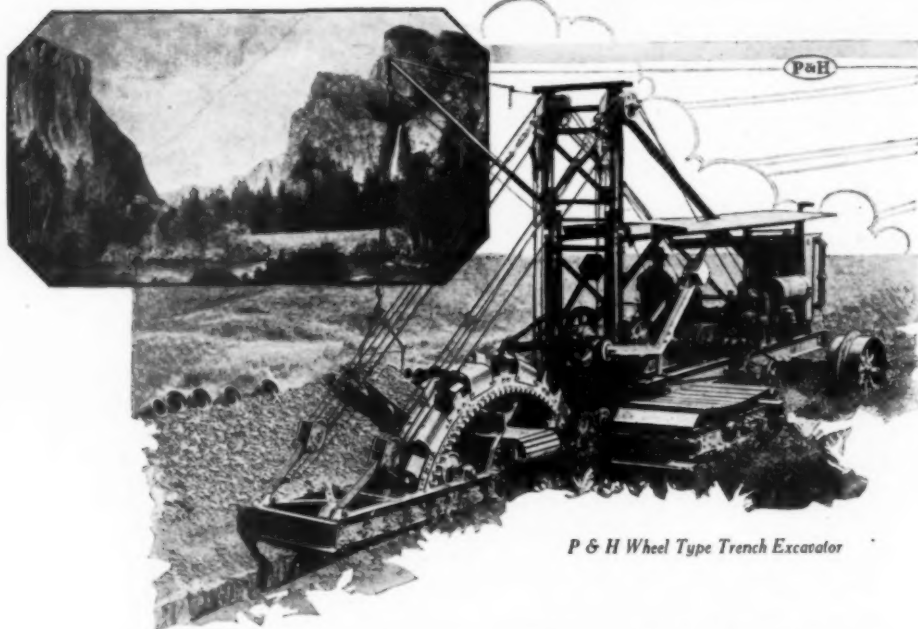
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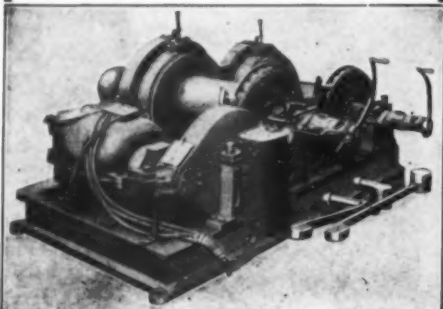
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1920

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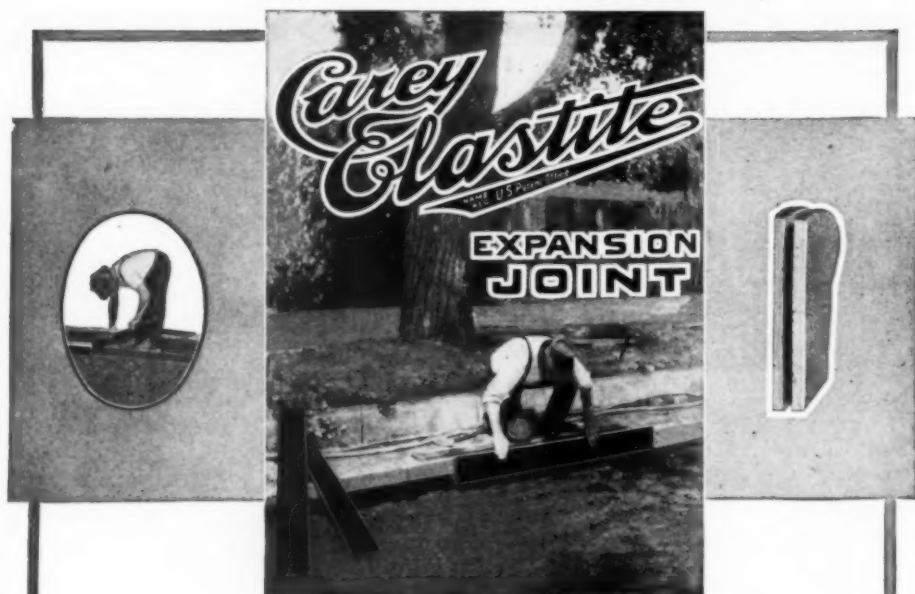
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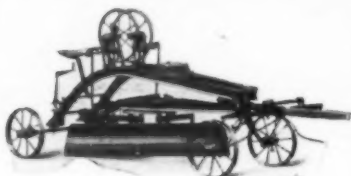
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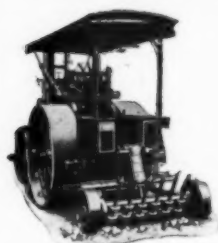
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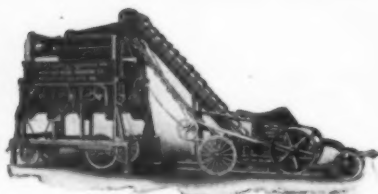
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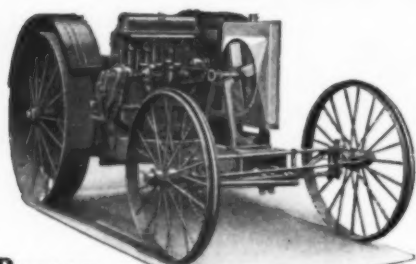


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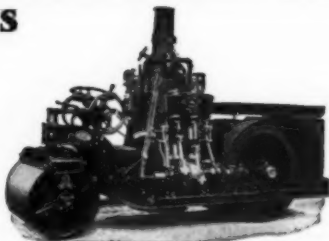
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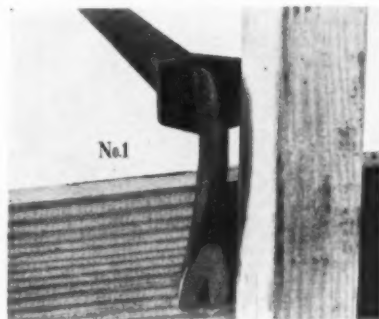
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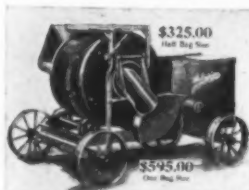
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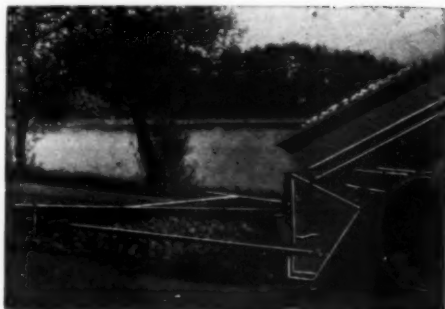
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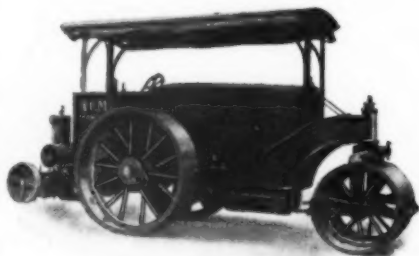
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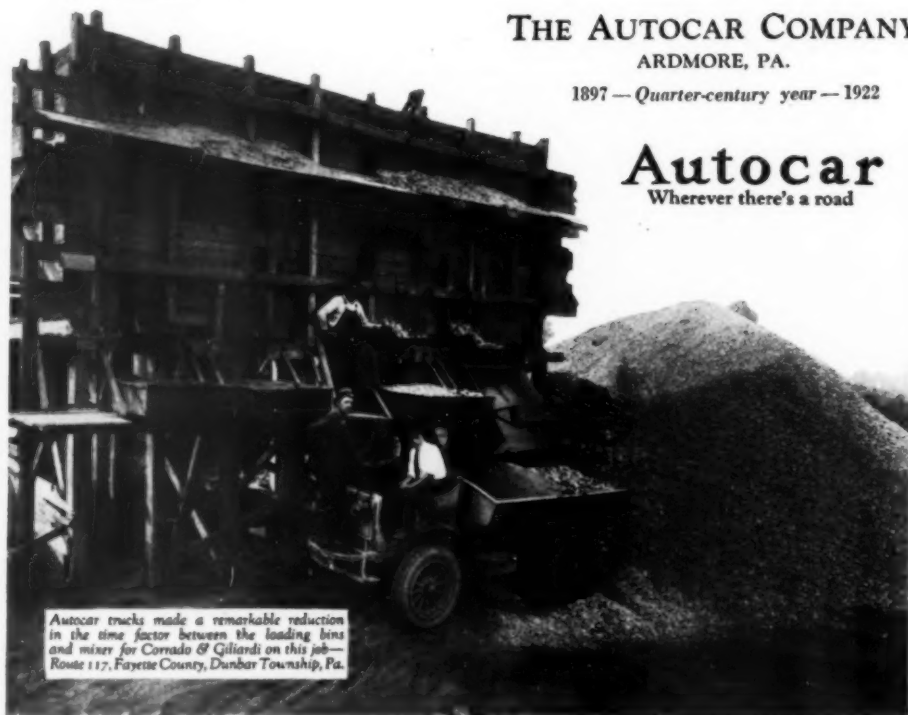
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Vol. IV, No. 2

New York, N. Y.

February, 1922

Vast Program of Building Construction Developing for 1922

By C. Stanley Taylor

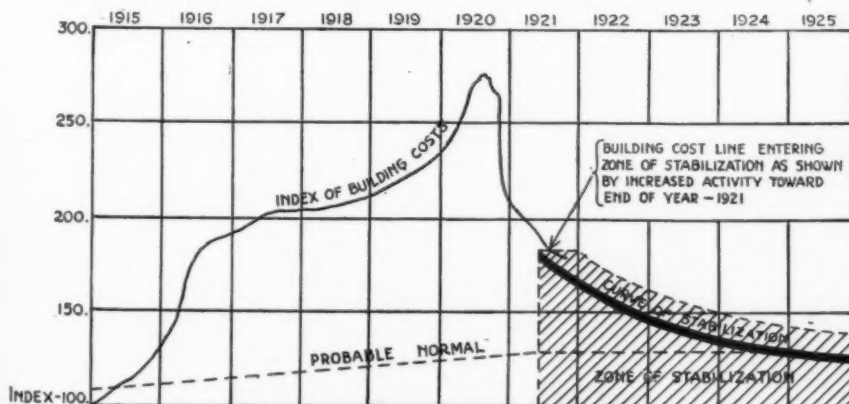
Financial Editor, The Architectural Forum

FOR the first time in several years it is possible to demonstrate sound reasons for optimism in regard to increased activity in the building construction industry.

This statement is not based alone on the fact that building reports show a considerable increase in the volume of contracts let in the last three months, and that here and there signs of pronounced activity may be recognized. These are merely indications of underlying conditions which demonstrate that with the year 1922 we enter a period of unusual activity in building construction, which will serve not only to meet the normal annual demand in this field but to contribute an annual quota toward the relief of the shortage in many types of buildings that

has developed during the last period of depression.

In connection with this article there is presented a simple graphic chart which is an interpretation of the present situation in the building industry and which serves as a guide for the purpose of anticipating future activity. In this chart we have shown the index line of building costs since 1915 to the present date. We have shown also a probable normal cost line based on the general increase in wholesale commodity prices and labor costs during the last twenty years, together with the fact that 1915 or 1913, which are the years usually termed normal, were really subnormal in the building field, owing to conditions at that time. There has also been introduced a curve of stabil-



GRAPHIC PRESENTATION OF BUILDING CONDITIONS

ization in which is to be found much encouragement for building and allied interests.

General expressions of opinion regarding the future of the building industry refer constantly to the term "pre-war levels." As a matter of fact, building investors have not been waiting for "pre-war levels," but for building costs to come down to a point where the element of stabilization of cost is introduced; in other words, for building costs to come down to a point where shrinkage of replacement values is not to be feared, or is offset by increased revenue and utility value which provides a sinking fund to meet excess cost (as above the so-called "pre-war level").

In every business cycle, as the index of production costs drops from high levels (more or less artificially produced by untoward circumstances), there comes a time when prospective purchasers can see their way clear to buy. So in the building field, when we reach a period where costs have stabilized to a point where the future shrinkage of replacement value is offset by the increased power of the dollar, it is evident that speculative builders in certain classes of residential property, where the demand is great, will begin to operate.

Similarly, in other types of building construction where the demand is great and financing is not so difficult to provide, construction will be started. From that point on, if there is reason to believe that the efficiency of labor is increasing and that actual production costs will be lower, it is evident that with each drop of actual construction cost toward the line of stabilization other investors who have been waiting for this period will begin to contribute toward the volume of actual construction activity.

Referring to the graphic chart for a moment, it will be seen that this curve of stabilization has been established with a gradual slope to meet the probable normal cost of building. About this curve has been drawn an area indicating the zone of stabilization, which really represents the area on the cost chart in which activity may be expected in proportion to the approach or withdrawal of the line of building costs to the curve of stabilization, and increasing greatly in volume as this area narrows down to the point where building costs reach the probable normal line.

Types of New Building Operations

The situation to-day is that within the last three or four months the line indicating building costs has actually entered this zone of stabilization. Consequently, we find a considerable increase during that period in the volume of money actually being expended in the building field. The building operations which at this period are swelling the quota include exactly the types of buildings and classes of investors which might be anticipated as the first to function actively in a reviving building situation. These are:

First, speculative buildings, particularly in the apartment house field, where quick re-sales to investors who wish to take advantage of existing high rentals may be expected.

Second, institutional buildings, which must be constructed to meet a definite shortage, and the financing of which is carried out through benevolent or governmental channels not necessarily forced by an investor's view-point to wait for future reduction in cost.

Third, public buildings which are provided on the same basis.

Fourth, an inexpensive class of residential building by future owners and by speculators, where the reduction in cost from the peak 1920 has been great enough to allow the building of houses of this nature within the financial reach of a fair proportion of those desirous of owning homes and tired of paying exorbitant rentals.

These are the types of buildings on which contracts have been let in the last three months sufficient to provide a material increase in the volume of building construction, and the important point is that this condition may be recognized as the first phase of a sound building movement.

Naturally, the more rapidly the line of building cost drops to meet the curve of stabilization as indicated, the greater will be the volume of construction. If the demand for new building should suddenly be made active by the letting of a great number of contracts, building costs would rise again and pass out of the zone of stabilization, at which time the volume of building construction would fall off alarmingly. This would be the result of a "quick boom" in building, and under present conditions such a boom would be very much to the disadvantage of every branch of the building indus-

try. There will be no such boom, however, because as a matter of fact there is not sufficient financing available to make it possible.

As the cost of building approaches the curve of stabilization, it will be noted that more and more financing is being provided; first, because the demand is greater, but principally because buildings under this condition offer better securities for loans.

Having established the zone and curve of stabilization, the important question is the future trend of the building cost line. Will it stay within the zone of stabilization as the time passes? If it does, a constantly increasing volume of building construction may be anticipated.

The Attitude of Labor

It is firmly believed that this line will, with certain deviations, approach more and more closely to the curve of stabilization, as indicated. We look to a consideration of labor as an important element in this situation, and what do we find? We find the intelligent labor leaders working definitely toward a fair adjustment of labor costs, having in mind a greater volume of construction which will mean more permanent employment for members of organized labor bodies in the building field, and consequently a higher average daily rate over the entire year than may be expected through short terms of employment at prohibitive rates. We find that where the labor leaders are not accepting this condition, the force of public opinion demands this acceptance.

In San Francisco building, labor has been established on the American plan basis. In Chicago the recent decision of Judge Landis on lower wage rates in the building trades is being forced by architects and builders as a basis of labor cost, and a great organization of citizens is being developed to see that this decision is carried out. In this manner building labor is either intelligently accepting a condition or is being forced to recognize the fact that it cannot stand alone on the platform of emergency wages when in all other branches of industry the logical deflation is taking place.

Added proof of the statement set forth in the foregoing paragraphs, together with other valuable data, has recently been furnished by an exhaustive survey of the plans now under way and building projects under

consideration in the offices of architects throughout the country. Accompanying this article is a tabulation of the results of this survey, which serves to indicate the great volume of demand in the building field that has been awaiting fulfillment at the time building costs approached more closely the curve of stabilization. This survey also serves to classify this demand and to foretell approximately into what classes of building construction the money invested in this field will be divided during this developing period of building activity.

Results of this survey of the coming building movement are particularly valuable because a larger percentage than ever before of the volume of building construction will consist of types of buildings which call for architectural planning.

Of all types of buildings indicated in the accompanying tabulation, there are but three classes in which construction in the past has been extensively carried on without a great measure of architectural design. These are industrial buildings, public garages and moderate-cost residences. In past years a large proportion of the volume of construction has been in the industrial field. This is not to be anticipated in the next few years, as the demand in this field has been fully met.

Automotive buildings are to-day almost invariably planned by architects to meet sales and to increase institutional prestige. Only in the field of moderate-cost residences will there be much construction which does not pass through the architect's office, and this for the reason that such a great number of good stock plans have been developed in this country that the average prospective home owner, in types of houses costing less than \$10,000, does not find it expedient to spend much money on architectural service. The point which we wish to make is that reports shown herewith directly represent a fair division of future expenditure in the building field.

With the representation of a clearer explanation of future activity in this field than has yet been made available to those interested in any branch of the construction industry, a definite objective is set forth. Every manufacturer and every labor organization should be interested in contributing to the holding of this line of building cost within the zone of stabilization and

toward directing its trend as closely to the curve of stabilization as may be possible.

The policies adopted by manufacturers and labor interests should be those of supporting and encouraging the realization of this large potential volume of building construction. If this involves the cutting of percentages of profit and cutting the wage

rate per hour, such encouragement will certainly bring about a great volume of sales of materials and a constant demand for building labor, which will mean a greater actual volume of profit and wage income shown at the end of the year for the contractor and the employee respectively for several years to come.

Draining Basements in a Michigan Village

Corrugated Iron Pipe Used Effectively to Keep Basements Dry

UNDER the supervision of R. P. Mason, County Road Superintendent, 1,712 feet of Armco ingot iron corrugated culvert pipe was recently installed in the village of Bark River, Mich., to drain the village, with the particular idea of lowering the water-table and keeping the basements of residences on the main street dry.

The pipe was 12 inches in diameter and of 12-gage metal. A cesspool was formed at the inlet of the main line, and the inlets of all pipes leading to the main line were



EXCAVATION ALONG THE MAIN STREET OF THE VILLAGE OF BARK RIVER



THE TEES OF PIPE WHICH WILL DRAIN BARK RIVER BASEMENTS

screened. An unusual part of the installation was the use of 300 additional feet of 9-inch pipe to drain the basements of the residences along the main line. The 9-inch pipes were connected by means of tees, one of which is shown in one of the accompanying illustrations. The other picture shows the installation along the main street of the village with sections of the 12-inch corrugated pipe ready for installation.

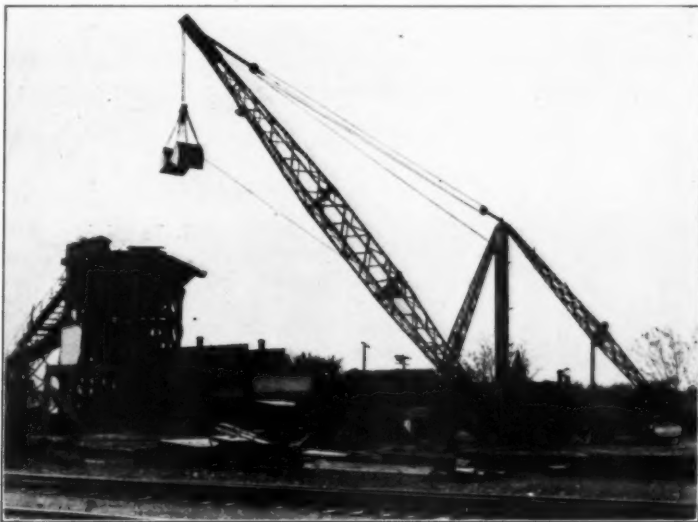
ACKNOWLEDGMENT.—Illustrations by courtesy of *The Highway Magazine*.

McCree-Moos Company Completes Large Section of Jefferson Highway Twenty-One Days Ahead of Schedule

Efficient Plant Management and Personnel Score a Distinct Triumph

ON October 10, 1921, the McCree-Moos Company, St. Paul, Minn., completed a contract for a long stretch of the concrete roadway on the Jefferson Highway between Becker, Minn., and St. Paul. This work was completed 21 days ahead of schedule, which says a lot for the ability of the men in charge, the organization, and the

be paved. The crushed rock used on the McCree-Moos job came from several sources, the Hilder Granite Company of St. Cloud, Minn., furnished some, as did the St. Cloud Reformatory, and some came from as far away as the quarry of the Trap Rock Company, Dresser Junction, Wis. The crushed stone arrived in gondola cars and



THE DERRICK FEEDS THE HOPPER FROM THE CARS OR FROM THE STORAGE PILE

capacity of their equipment. The concrete was laid both ways from Clear Lake, the work being handled in such a way that when laying concrete at the ends of the section worked from the Clear Lake mixing plant, the trucks which hauled the concrete to the place where it was laid traveled for about half the distance over completed pavement. This practice is general among concrete road contractors who use motor trucks for hauling the concrete from the mixer to the job.

The mixer plant was located at Clear Lake, Minn., in the center of the section to

was unloaded into the stock pile by an American steel stiff-leg derrick of 10 tons capacity. This derrick has a 90-foot boom and a 40-foot mast and handles a 2-yard clam-shell bucket, and, besides keeping the cars unloaded, kept the crushed rock hoppers above the mixer filled at all times. The hopper held $1\frac{1}{2}$ cars of rock. The derrick was operated by an American $8\frac{1}{4} \times 10$ three-drum hoisting engine with a 4×5 independent slewing engine to swing the boom. This 4×5 takes steam from the hoist boiler, as does the independent slewing engine which is used as a car puller. This



THE POWER-PLANT, AMERICAN HOIST AND TWO SLEWING ENGINES

latter engine has pulled as many as 15 loaded cars at a time. Heavy clam-shell work of this character really calls for a 9 x 10 hoisting engine, but the 8 $\frac{3}{4}$ x 10 was used with apparent satisfaction.

The ruggedness of the entire derrick outfit was well demonstrated by the fact that from the middle of August until the 10th of October it ran full speed for two 10-hour shifts out of every 24 and was not laid up for repairs. About 325 30-yard cars was an average week's work.

A 1-yard batch mixer was used on this job, each batch being given a 1-minute mix. Sand was taken to a 30-yard hopper above the mixer by a belt conveyor. Cement was stored in a thoroughly water-tight shed holding from 12 to 15 car-loads. The batch hopper in which the dry materials for the mix were measured was calibrated in the interests of speed and accuracy. Materials were put into the hopper in the following order: rock, sand, more rock, then the cement. One minute was allowed for mixing and 12 seconds to dump. The concrete was hauled from the mixer to the road by a fleet of 12 2-ton dump trucks. The mixing plant had a capacity of 2,686 square yards a day, laid down. The regular working day was 10 hours.

The pavement on this section of the Jefferson Highway is 18 feet wide and has an average thickness of 7 $\frac{1}{2}$ inches. The re-

inforcement consists of two longitudinal $\frac{7}{8}$ -inch steel rods placed 6 inches from the edges, and $\frac{5}{8}$ -inch lateral rods spaced 8 feet apart.

The Clear Lake mixing plant handled about 8 miles, about a mile a week being the average rate of progress. Fred Mork, Superintendent for the McCree-Moos Company, devised an effective scheme to keep his working force up on its toes and to create a healthy rivalry between the different gangs. This was a long, narrow black-board nailed to the side of the tool-shed and divided into eleven equal sections, one for each hour of the working day and one for the day's total. The road was staked off into 100-foot sections, and every hour reports came in covering the number of feet just laid. Each hour's accomplishment was marked up in its proper place on the black-board, and woe betide the gang that was responsible for any falling off from the record of 100 feet an hour. When the number of lineal feet climbed over the 100-foot mark, there was appropriate rejoicing; when it fell below, you could cut the gloom with a knife. At Clear Lake the best single day's record was 1,162 feet in 10 hours, but at Becker, Minn., they ran the total up to 1,343 feet in 10 hours.

The following is the method of starting the work from a new mixer plant set-up. Beginning two or three miles from the plant,

the road is built back to the plant; the motor trucks then haul the concrete, traveling over the grade to the dumping point. When this section is completed, the same process is repeated on the other side of the plant. As a usual thing, 21 days is allowed for the concrete to set. At the end of that time work is begun on the extreme end of the section on which the first concrete was laid. This permits the trucks to operate for two or three miles over the new pavement and greatly simplifies the haulage problem. This was the practice which was followed by McCree-Moos Company at Clear Lake,

and the fact that it completed its contract 21 days ahead of schedule makes further comment unnecessary. Up to the time the work at Clear Lake, Minn., was completed, the company was employing about 125 men on its road contract. These men worked in two ten-hour shifts. For night work, the derrick, stock pile and mixer were lighted up by 110-watt electric lamps, and the work on the road was lighted by portable carbide lamps. The entire job was handled under the general direction of Mr. McCree, with Fred Mork in direct charge.

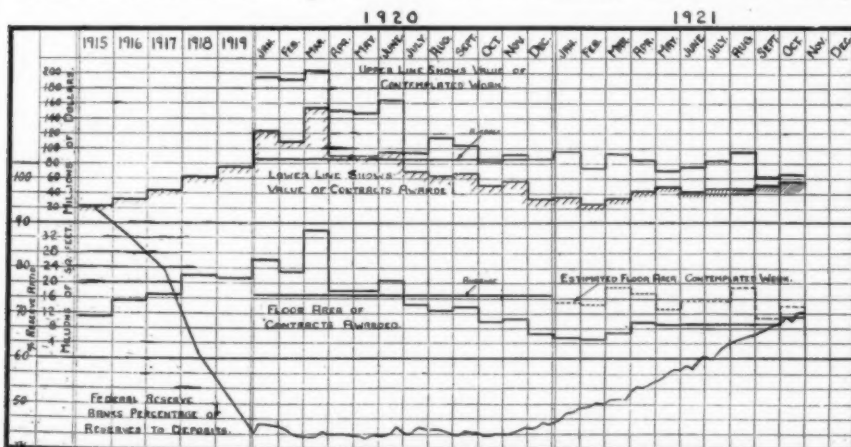
A Suggestion for Stabilizing Building Costs

Removing the Seasonal Differential in Costs Increases Building Activity

WHEN we compare the chronic unrest of the building industry with the comparative peace in manufacturing industries, we find that this unrest arises in a quite natural way from the conditions under which building is conducted. Chief of these is the seasonal nature of most building. Since it costs a little less to build in summer than in winter, owners incline to let contracts in the early spring. This leads to a human preference on the part of labor for making wage agreements after contracts have been let, that is, usually May 1. The resultant uncertainty makes both the owner and the contractor hesitate to sign contracts

until wages have been fixed, thereby intensifying the seasonal tendency.

The final result is that labor is largely idle during the winter, contractors must earn their winter overhead during the summer, and with largely transient contact on both sides, neither feels any great interest in the other's problems. Hence, it is hardly strange that both employers and workers feel that self-protection requires them to do things which do not commonly occur in industries whose workers have fixed jobs, fixed homes and some understanding of their employers' needs. Not only do contractors and workers find themselves burdened with the high



BUILDING CONDITIONS IN THE UNITED STATES, 1920-1921

costs of seasonal employment, but the material manufacturers likewise must choose between manufacturing for stock during dull months, and laying off part of their help.

All of this complicated chain results from the difference in cost of construction between winter and summer. If that cost could be equalized to the owner, he could start building at any season without added expense, and building would immediately become an all-year occupation. The employer would keep his men, the workers would keep their jobs, the peak cost of summer building would be leveled, and everybody would be the gainer through the more uniform distribution of cost and effort. This condition could be brought about by a joint agreement of material makers, labor, and building contractors to maintain a graduated scale of prices, wages and profits, with just enough difference between the winter and summer scales to offset the cost of building. Ways are frequently found to reduce this difference in cost, but whether it be high or low, any difference necessary in scales would be cheaper than the present chronic winter unemployment.

Instead of taking a lower rate of pay in the winter months, labor might work an additional half-hour per day for five days, and perhaps two hours additional on Saturdays, the week's pay remaining the same.

It will not be necessary to have a formal agreement between the parties interested, provided it becomes a recognized trade custom to reduce prices, etc., in the winter.

Neither will it be necessary to get all the material manufacturers, all contractors, or all labor into even an informal understanding. If the leading manufacturers of each kind of material used, a few leading contractors, and a sufficient number of artisans in the building trades will make a start, the rest will logically follow. Such a start can be made locally wherever a sufficient number of contractors and artisans get together and secure the support of the material men. The contractors might be those best equipped for handling winter work, and the workmen might be either union or non-union. It would only be necessary to show them the advantage of working on a fair wage scale rather than being idle.

There can be no question that publicity will be needed. The various building organizations should be able to do effective work in this direction, and, in addition, each general contractor should see that the architects and leading owners of his locality are posted.

It might be to the advantage of the building trade to make special prices on large non-industrial buildings, which can be started at any time, in order to keep them from being held back for summer construction, when the industrial work is due.

This interesting discussion of the building situation has been offered to architects, engineers, contractors and large industrial concerns throughout the country by David Lup-ton's Sons Company, Philadelphia, Pa., to whose courtesy we are indebted.

Labor Costs on Buildings

Department of Commerce Reports Costs for Each Labor Group in
Building a Six-Room House

THE Department of Commerce has announced the following figures showing the percentage which the amount paid to each labor group bears to the total labor cost of a six-room house. These averages were constructed from reports covering a large number of six-room brick and frame houses throughout the country. The relation of the amount paid to the various groups to the total labor cost varies according to the types of construction prevailing in the various localities. These averages,

however, give a fair view of the general distribution of labor costs.

TOTAL LABOR COST 100 PER CENT		
Trade	Frame House	Brick House
Carpenters	40.6	32.2
Bricklayers	6.2	21.5
Hod-carriers	2.2	6.7
Plasterers	7.0	8.8
Plumbers	6.7	7.6
Electricians	2.6	2.5
Painters	10.0	6.3
Common laborers	6.3	9.9
All others	6.5	4.5
Total	100.0	100.0

The Care of Motor Truck Tires

Both Trucks and Tire Life Prolonged by Reasonable Care

CORRECT size, style, quality and general suitability of tire equipment are quite as necessary to low-cost operation of motor trucks as selecting a truck of special design, speed and carrying capacity. The cost of hauling per ton-mile can be determined only by a close check on maintenance and depreciation. Perhaps more is expected from the tires than from any other part of the truck, yet often they are given the least consideration.

Reasonable study and control with reference to loads carried, speed, frequency of stopping and starting, and road conditions, will keep the operation cost at a minimum. Quality alone, whether it pertains to tires or trucks, will not insure the best showing, but a combination of quality and proper care will result in maximum service and minimum cost of up-keep.

The use of a definite cost system for motor trucks is particularly valuable in checking up not only motor truck operation but tire service. The National Standard Truck Cost System has been worked out and adopted. This system was adopted after a careful study of many systems and is designed to meet all conditions of operation for both gasoline and electric trucks. Subscribers for the *CONTRACTORS' & ENGINEERS' MONTHLY* may secure sample forms free by writing to the New York office.

A comparison of cost figures will develop many possibilities of economy and causes of much waste. As time-saving ideas pass from operator to operator, expensive methods are dropped. The operator can compare his tire expense, oil, gasoline, etc., with those of hundreds of other operators, which is highly advantageous.

Speed of Trucks

The truck manufacturer should be consulted with reference to the speed at which each model of truck should be driven. Proper speed means greater efficiency from truck and tires. The normal speeds recommended by engineers are as follows:

¾- and 1-ton	18 to 20 miles per hour
1½-ton	16 to 18 miles per hour
2-ton	14 to 16 miles per hour
2½-ton	12 to 14 miles per hour
3-ton	12 to 14 miles per hour
3½-ton	12 to 14 miles per hour

4-ton	10 to 12 miles per hour
5-ton	8 to 10 miles per hour
6-ton	8 to 10 miles per hour
7-ton	8 to 10 miles per hour
Tractors	8 miles per hour

Depreciation, loss of time and cost of maintenance can be greatly reduced by operating trucks at proper speed. Excessive speed does not necessarily mean speed above that recommended for the truck. The conditions of some streets and roads make normal speed inadvisable. It certainly is bad practice to drive a truck over rough pavement at a speed that causes the wheels to bounce. Rear wheels revolve faster when losing traction and free from the roadway. When the weight of the truck, added to the tremendous kick of the spring rebound,



CHAINS ARE THE ENEMY OF TIRES

It pays to use them only when necessary and to remove them as soon as the necessity has passed



AVOID BAD ROADS WHENEVER POSSIBLE

This is an example of the destructive effect of a poor road surface on a solid tire

forces the wheel back to the ground, it receives unusual abrasion, and the tread wears off quickly. The effect is nearly the same as if the tire were held against an emery wheel.

Under normal conditions the wave in the tread rubber in the tire ahead of the part in contact with the road is overcome to a certain extent by the reactive or snap-back qualities of the stock, but when the truck is driven at excessive speed this wave naturally passes around the tire more quickly and the wave length becomes shorter and more localized. The rapid distortion and flexing of the tread rubber creates heat, which impairs the strength and life of the rubber. Excessive heat in a solid tire makes the rubber brittle.

Selection of Tire Equipment for Trucks

For the most economy in operation of the truck, the tire should possess the greatest

degree of liveliness practical with toughness to carry the load without breaking down in long, continuous service. Tires adapted to the conditions of usage play an important part in the performance of the truck and its maintenance cost. Selection of a tire suitable in size for the weight of the truck and load is perhaps the item of most importance. The weight of the truck should be ascertained by running the front half of it empty onto a platform scale, the middle of the wheel-base to be the dividing point, and then weighing the rear half of the truck in the same manner.

There is no standardization of tread width of truck wheels. The measurements of the tread widths and wheel-base are varied to accommodate the carrying capacity. The schedule of carrying capacities for tires is therefore not applicable to all trucks. The schedule furnished by tire manufacturers will form a basis in selecting tires of proper width and diameter. When larger tires are required, it is frequently better to increase the size by cross-section rather than diameter. In view of the important relation of the tires to satisfactory and continuous service from the truck, it is advisable that truck owners consult an authority when purchasing new tires, in order to be sure of realizing the most from the investment.

Overloading

As a factor of safety, trucks are usually constructed to carry somewhat more than their rated loads. Excessive overloading, however, affects the entire truck, including frames, springs, axles, axle bearings, wheels, power-plant, clutch, driving mechanism, and tires. When subjected to excessive weights, the steel in the frame, springs or axles has a tendency to take a permanent set after reaching its elastic limit. Continuous overstraining makes these parts more sensitive to shocks and vibrations. Gradually the steel crystallizes, and breakage results.

Wheels.—Overloaded wheels tend to become egg-shaped. Wheels "out of round" have a thumping, pounding effect on other parts of the truck and wear out the tires rapidly.

Power-Plant.—Overloading strains the motor and other parts of the power-plant with excessive heating and wear to the pistons and bearings.

Clutch.—With overloading, the clutch is liable to slip, heat and burn.

Extra Trip.—It may seem economy to overload, rather than make an extra trip. Engineers claim that added trips with normal loads make the greatest saving.

Care should be taken to turn sharp corners slowly, otherwise the shifting of the weight will cause more strain to the inside tires.

A simple means of approximately determining the weight of the load at a glance can be observed by fastening two metal rulers to side members of the frame just above the center of the rear spring. The rulers should be attached so that they will be free and not bump against the axle, springs or other parts. Properly distribute the normal load in the body and note the amount of flexing or flattening of the springs. For example, if a load of three tons causes the springs to flatten so as to register a certain measurement on the ruler, mark the ruler at this point. It will always be possible afterwards to know whether the rear tires are overloaded, either from excessive weight of the load or from careless or improper arrangement of the load; the same device can be used in relation to the front springs, but it is not so important.

The amount of rubber in a solid truck tire is proportioned to the load it is to carry. When the tire is seriously overloaded or even moderately overloaded for long periods of time, the elastic limit of the rubber is exceeded.

It pays to remove chains from wheels as soon as the necessity for them has passed, as they are bound to injure tires when left on for any considerable length of time. It is also better economy to take the longer way around if by so doing bad roads can be avoided, as the injury to tires and springs from bad roads greatly reduces the length of life of the tire and truck.



OVERLOADING DESTROYS TIRES

Solid rubber tires are not built for speeding, and excessive speeding, besides being a dangerous proposition, is an economic waste of truck and tire. Furthermore, driving in street-car tracks should be avoided. Street-car tracks were made for steel wheels, so why try to wear them out with rubber? Only part of the tire supports the truck and its load, and that part is subjected to undue wear, causing the tire to take the shape of the rail and rapidly disintegrate through overloading.

Improving the Pavement Along Street Railway Tracks

ENGINEERS have used various methods in an effort to obtain a successful type of construction for paving along street railway tracks. They have been confronted with this problem of devising the most durable and economical pavement, one that will have resilient qualities capable of absorbing the vibration caused by passing cars, and which will prevent water from percolating through to the base of the tracks, thereby weakening the foundation.

The paving along the railway tracks of Dalton Avenue, between Santa Barbara and Vernon Avenues, Los Angeles, is an experience of many

years and is being brought to the attention of engineers as a worthy example of the inherent qualities of asphaltic concrete pavements for this type of construction.

The manner in which it was constructed is as follows: Upon the soil, which is a heavy "black adobe," was placed crushed rock having a thickness of 6 inches after rolling. The ties were laid on this base, then a layer of crushed rock was placed around the ties, and well tamped to a thickness of 9 inches. The surface consists of a 4-inch asphaltic concrete pavement, Warren type.

Surface Effects Through the Varied Use of Cement

How a Little Care and Ingenuity Can Break up Monotonous Spaces

THE surface is the public's point of contact with architecture. The architect draws his plans with a keen realization that all parts exposed to the public gaze must be in absolute harmony, well balanced and attractive in order to hold the eye, rather than turn it away. He dwells as long on the choice of these materials and their application as he does on the exactness of the figures that carry the load and on where the stress falls in placing beams. His observation during the last decade makes him to-day desirous of working with cement, because time has demonstrated the possibilities that can be worked out and has shown him that the flexibility of the material affords him an almost unlimited opportunity to design distinctively different styles.

Contractors and builders are showing a live interest in all forms of cement use, for the property owner has been made aware of the handsome effects that are easily possible, along with the other advantages of being fire-proof, eliminating painting, etc. A few of the surface effects for homes, garages, office buildings, shops, posts, walls, garden furniture, etc., are outlined in this article.

Solid mixtures containing highly colored aggregates, such as marble or granite chips, may be made to almost exactly duplicate costly cut stone as taken from the quarry, if enough aggregate is used. The coloring of ordinary aggregates can be produced by the use of different colored pigments, such as yellow ochre, burnt umber, iron oxide,

Venetian red, lamp black, rouge, any of which can be obtained from the local paint and coloring stores.*

While still green, cement surfaces can be troweled very effectively by long strokes or cross-hatching, or can be brought to a very rough relief by the suction process. This is one of the most common methods and goes well toward adding a massive appearance to

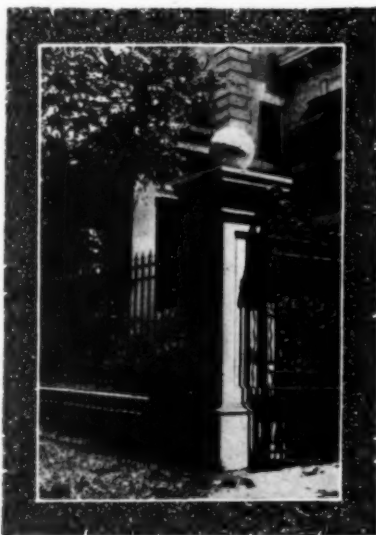
large, plain surfaces where there are no openings. Shadowed effect that is produced by introducing many rugged points can be used to break the monotony and give life to the wall of ordinary dull cement when no extra expense can be incurred. An equally distinctive effect can be had by "throwing in" a surface of rich concrete composed of cement and sand, or a relief can be brought out by rough troweling with a float.

Highly colored surfaces full of life and luster are made by throwing sparkling aggregates against a

soft wall. These particles of stone should not exceed $\frac{1}{4}$ -inch in size, and when embedded in the wall at least half of the chip should be exposed. These aggregates can be bought from the material companies handling concrete supplies, or from stone-cutters.

The pebble-dash finish is well adapted to walls, trimmings, foundations, rustic arches, bridges, and so on. It is finished off by pressing pebbles not over an inch in size into green concrete, leaving one-half of each exposed.

A sand finish is not necessarily desirable



GATE-POST WITH DISTINCTIVE PANELS

over large surfaces unless it is made with very coarse sand that is full of luster. Fine sand is lifeless and does not break the monotony. However, it makes an appropriate wall for public-service buildings.

Paneling

Probably the most effective type of surface that can be made is the paneled one. Paneling itself is one common way of breaking the plainness of a large surface, but the making of too many panels must be guarded against. Hundreds of small ones only make a confusing number of the same straight lines. A safe way to overcome this is to plan for not more than can be counted at a glance. A good way to estimate this is to think of a flat side of an average-size house, having not over six windows (panels) and yet having enough breaks in the plain wall to keep clear of monotony.

Cement panels can be made by raising or sinking in a border. The simplest method is by nailing strips of board to the inside of the mold, which, when removed, leaves a sunken border enclosing a panel. Simple cement block can be arranged to display panel effects by laying a tier or series of tiers horizontally and then laying a tier on end. Even projecting an occasional tier beyond the wall proper does a great deal toward breaking up the sameness of a large wall made from an unattractive style of blocks. Wooden panels can be arranged by the use of dressed lumber nailed on the surface of the lath as part of the permanent building, and can be painted after the stuccoing is finished.

The most modern style in paneling, and one that is considered in better keeping with masonry, is brick borders or liners, which can be cement brick, as these are made in a

variety of artistic facings. These harmonize, making a complete structure of stone with just enough outside material to cause a pleasing contrast. Where there is enough thickness of green cement, this can be carved to suit the taste. Not a great deal of skill is required for such simple designs as scrolls. This work should be done with masons' chisels when the cement has set just enough so that it will resist the pressure of the hand when slapped against it.

Mosaics

Studying the ornamentation of surfaces from a historical angle discloses the old art

of mosaics. This is recognized as being one of the best styles of reproducing conventionalized designs in pavements and walls. The more intricate pieces of craftsmanship are displayed in mantels, fireplaces, wainscoting and floors. Patterns from simple borders to figures of people and animals have been worked out successfully. Clay tiles of various colors and dimensions, either glazed or dull, are pressed into a foundation of cement, a thin line of cement being allowed between each two for binding the mass together.

Conventionalized relief work for friezes, moldings, panels, cornices, etc., can easily be put into use by pressing wooden hand-carved templates into the cement before it is set.

Cement surface imperfections belong to either one of two classes: monotony is one, and contrasts that clash so sharply with one another that they cause unrest to the eye is the other. By monotony is meant the effect which is evident in spacious, dull wall spaces—too much uniformity where the eye longs for variety. This is due to the lack of an occasional breaking of the lines. Huge,



SMOOTH CEMENT BLOCK POST paneled and shadowed



A LIGHTING STANDARD BASE WITH SMOOTH AND SANDED FINISH COMBINED

smooth blocks are unattractive in themselves, but can be made into attractive panels, each covering many square yards of surface; if the border line is set off with grace, or if the panel is sunk in sufficient depth or projected enough beyond the wall proper to cast distinct shadows, the paneling becomes distinctive. Shadows which nature furnishes us form one of the greatest aids in bringing out art, and should always be kept in mind when planning molded work, such as cement improvements. Whatever the style of architecture, colors or materials used, shadows are always in harmony. In looking across a wall there are always certain portions that we take note of, perhaps unawares, such as the break between the foundation and the space from there upward and the cornice or frieze at the top. Windows are great aids in breaking stiffness, but to these can be added original or novel designs in style of casings, moldings, selected aggregates, troweling and tinting, none of which add materially to the cost if simply done. One of the greatest difficulties to overcome is monotony when the cement block is specified (either smooth or rough-surfaced ones), as they are lifeless in color. When one looks across a wall of this style, each block gives the same impressions as the

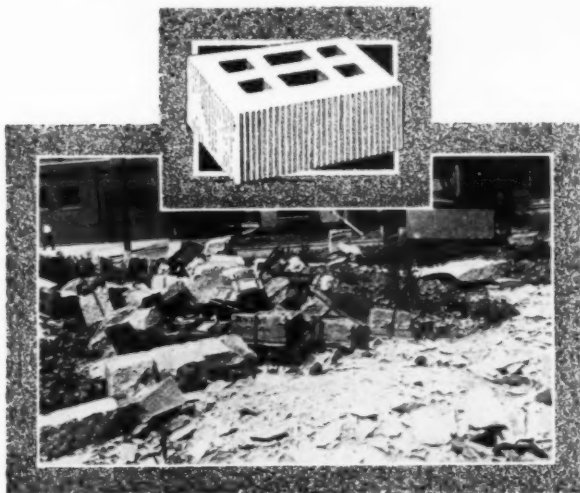
one adjoining, so, taking it as a whole, the wall is a blurred mass of uniformity. To break this sameness and attract attention from the large spaces of the wall, arrange for a slightly conspicuous block below each window, and corresponding quoins or corner blocks at each break of the wall.

Every style, shape and form of cement construction, whether it be blocks dull in color, plain stucco with no luster, hundreds of square feet of cheap plastering, or richly colored pigments, selected marble, granite or quartz aggregates, pebbles, hand-tooled, mosaic tiling, or what-not, has its place and represents a true worth when used where it belongs, but if we weigh each particular job carefully, true art can be displayed by a few curves, scrolls, different applications in ingredients when mixing, or the relief brought out when surfacing.

The amateur craftsman, in building more delicate structures, such as flower boxes with relief sides, either made with a form or template, or hand-carved, affords himself a wonderful opportunity to display his personal tastes in surface treatment. As for the foundation of the vessel proper, it can be cast in a mold and the sides manipulated when still green, or it can be very roughly surfaced and a richer cloak applied later,



EXCELLENT RESULTS DIRECT FROM THE MOLD



ABOVE—A CONCRETE TILE WITH CORRUGATED SURFACES TO RECEIVE STUCCO. BELOW—A LOCAL STONE CUTTER'S WASTE PILE MAY SUPPLY SELECTED AGGREGATE

first soaking the vessel thoroughly with water to warrant good bonding. The transformation of the plain surface into an

artistic one is much the same as clay molding, with which we are all familiar.

ACKNOWLEDGMENT.—Illustrations and text by courtesy of Alpha Portland Cement Company, Easton, Pa.

An Excavator for Drainage and Sewer Jobs

THE increase in the number of ditching contracts, including sewers, drains, road contracts and similar work, which contractors are called upon to handle, practically forces the man who would work to advantage to seek the services of the steam shovel or an excavator. The type of excavating machine made by the Economy Excavator Company, Iowa Falls, Iowa, has proved successful on the many ditching contracts on which it has worked. On the small open work job, the cost of transporting, hauling, ejecting and wrecking almost prohibits the use of some of the heavier types of excavators, even at the high figures at which the work can be obtained. The manufacturers claim that the Economy excavator can do this work and eliminate nearly all these expensive costs. On combined open and tile contracts, the same conditions apply. On the average clean-out job for large open ditches, there is only a few thousand yards of material to be moved; hence, high figures are usually quoted, even up to 50 cents per cubic yard.

On account of the long boom on the Economy excavator it is possible to dig a wider ditch than with the average small excavator and still give the ditch the berm usually required. The bucket is made to dig to any required slope, and leaves the sides smooth. As appearance counts greatly

in getting work accepted, this feature is valuable. These machines have thrown as much as 125 cubic yards an hour, and in some cases have averaged 500 yards per shift. If contractors are getting from 14 to 22 cents per yard for the small job, from 300 to 400 yards a shift makes it a good proposition.

This excavator digs from 1 to 20 feet in depth. The only time lost in digging the greater depth is in the hoisting, which is done very rapidly. A special feature claimed by the manufacturer is the speed with which the machine can be erected and set to work. Four men have often erected one in three days, and four is about the average. Thus, the machine is particularly mobile and can jump from one job to another with a minimum loss of time. Two men only are required to operate this excavator on average open work, one man for the actual operation, and one man for general work around the machine. The second man is merely a time-saver for the operator, but with two men working together it is not necessary for the operator to leave the station, enabling him to keep the bucket moving continuously.

Ditch cleaning and repairing is an important factor in drainage work. Many of the first ditches constructed have been found inadequate and in some cases were not properly constructed.

The cleaning and repairing of them is an entirely distinct kind of work from new ditch making, and requires a different machine, as the ditches usually have to be sloped as well as deepened. A weak machine will not stand the work, for the reason that in most cases the grade line is changed, necessitating the moving of hard material as well as silt. The average old ditch is very rough along the berm and in many cases has caved back into the waste bank, which makes traveling with a heavy machine very difficult. This type of work and the enlarging of irrigation ditches are features of the comparatively light-weight Economy excavator.

Another type of work for which the machine is adapted is the laying of tile over 20 inches in diameter. It can cut a trench straight down, one bucket wide, and very near to the grade. With the standard bucket, the trench will admit a tile up to 42 inches. Narrower dippers are

built for digging trench for tile under 28 inches. No curbing is used in places where the trench caves, as it is much easier to allow it to cave to its natural slope and throw out what is in the trench line. The feature is rather important, because the cost of lumber and labor in building curbing is high. Where the ground is visibly inclined to cave, the trench is usually sloped a little when first dug, thus preventing a great deal of the caving. Very little time is lost by this method. The excavator is equipped with drum, clutch, cable, sheath and large tile hook so that it can handle tile from the point where they are hauled and place them directly in the ditch. This is a particular labor-saver if the tile weighs from 1,000 to 1,800 pounds. The average crew for this excavator on tile work is four men—an operator and a general man with a single bottom man and an assist-



WORKING ON A 60-INCH SEWER CONTRACT JOB, SALT LAKE CITY, UTAH
Machine owned and operated by J. W. Mellen, Salt Lake City

Aim High

Make no little plans. They have no magic to stir men's blood and probably themselves will not be realized. Make big plans, aim high in hope, and work, remembering that a noble logical diagram once recorded will never die.—*Daniel Burnham.*

ASSOCIATED GENERAL CONTRACTORS

NEWS NOTES AND COMMENTS

Annual Convention at Cleveland

A DEFINITE assurance that construction recovery is under way and that it is the first phase of a general business revival, sums up the results of the construction conference held in Cleveland January 17 to 19.

Colonel Leonard P. Ayres, Vice-President of the Cleveland Trust Company, stated that prices will probably continue to fall, intermittently, for ten or twenty years more, but conveyed assurance that construction can go along for nine years at 25 per cent above normal and only fill the normal demand by the end of that time.

Charts shown indicated a sub-normal volume of building for every year since 1912. Even the large building figures for 1919 and 1920 are only apparent. The cost was large, but the building was far behind even the current needs of the time. The only time in the last nine years when the volume has gone above average requirements was for the last few weeks of October, 1921. This was chiefly residence buildings, but, in Colonel Ayres' opinion, it shows that the tide is rising rapidly.

Determined not merely to predict prosperity, but actually to observe it, the constructors arranged a program in which the theme of waste elimination was constantly emphasized.

J. Park Channing of Boston, who succeeded Herbert Hoover as Chairman of the Federated Engineering Organizations, gave the major paper of the conference on this subject and said that 25 per cent of the responsibility for waste rests on labor, 50 per cent on management, and the remaining 25 per cent on outside relationships. In respect to industrial accidents, however, he asserted that 85 per cent of the responsibility rests on the individual workman. Constantly changing personnel is a case of waste treated by the speaker, and he recommended measures to increase the period of active work so that employment will be more nearly an annual affair. He expressed faith in the method of reasoning with employees

rather than ordering them, when labor emergencies are encountered. Material control was treated as a major time-saving proposition in the building business.

Cost-plus contracts, fee contracts and efforts made in some projects to eliminate the general contractor were discussed. D. A. Garber, of New York, voiced the belief that few architects and engineers can qualify to direct a building project in the place of the general contractor. Godfrey Edwards, of Los Angeles, decried anything but lump sum contracts, believing that when a builder takes a job on a cost-plus or a fee basis he is paving the way for his own elimination.

Other speakers at the convention were Ernest T. Trigg, of Philadelphia, President of the National Federation of Construction Industries, whose subject was "Cooperation in Construction," and Colonel Evan Shelby, New York attorney, who was formerly legal advisor to the Construction Division of the Army, who spoke on "Organization in Construction." He said that the opportunity before the construction industry is very great if and when the public's confidence is secured. We have passed the stage when the employers and the employees can get together with themselves and with each other and determine the affairs of the third party, the public. The public has come back into its power, but, until the public's confidence is restored, construction is not going to revive. The obligation rests with the leaders in the construction industry to clean house. They must see that the customs of the trade which hold up costs and neutralize the effects of competition be done away with. They must also take the initiative in promoting more cordial and economical relations with their workmen. They must not take advantage of the fact that they have the whip hand. By taking the broad view of things, they will bring about a condition of peace in industry where both they and their employees will share in ungrudged prosperity.

Colonel Shelby outlined the steps by which

the general contractors were organized for the first time during the war, an organization which preceded the one just closing its convention, and pointed to the accomplishments of its short existence as forecasting the progress which will be realized by simplifying the forms of contract, promoting research in industrial methods, and improving the relations of the contractors with the material dealers and workers.

A. G. C. Biographies

Noble Foster Hoggson, President, Hoggson Brothers, specializing in building construction in New York City, is a specialist in bank planning and equipment and has been a national factor in the construction industry in the United States for more than a quarter of a century. Hoggson Brothers, established in New York in 1889, originated the form of contract under which they assumed the responsibility of an entire operation, including the architectural design, building construction and equipment, in an



NOBLE F. HOGGSON



C. H. HELLUMS

effort to secure closer cooperation among the client, the designer and the actual builder. By this work they developed a national organization which performs the functions of architect, equipment engineer and general contractor. In the industry, Mr. Hoggson is known as a practical idealist. He represented the A. G. C. at the organization of the International Chamber of Commerce in Paris in June, 1920, where he introduced a resolution calling for a survey and analysis of the entire construction industry. A definite, clear-cut analysis of the economic situation as applied to the construction industry had never been made and the lack of essential data and information has been a great obstacle to the solution of the problem now before the industry. Mr. Hoggson's resolution and the action resulting from it are expected to greatly clarify these problems and assist in their solution.

C. H. Hellums is a contractor at St. Joseph, Mo., where he specializes in residence and business construction.

Jersey Tunnel Low Bid—\$19,250,000

The largest bids ever submitted for an enterprise around New York City were those opened on Wednesday, February 15, for constructing two tubes under the Hudson River for vehicular traffic and for sinking the shafts in Jersey City. The successful bidders were Booth & Flinn, Ltd., New York City, whose figure was \$19,250,000. P. McGovern, Inc., bid \$20,960,000, and Holbrook, Cabot & Rollins Corporation, with the Keystone State Contracting Company, jointly bid \$22,191,030.

A NEEDED CATALOG

The catalogs and pamphlets listed below are available for free distribution. Contractors and Engineers who check over these pages each month and write for such material as interests them, will find this a valuable means of keeping up to date on the subject of machinery and equipment.

ALWAYS HANDY

TOOLS FOR REMOVING CONCRETE FORMS

Folders and price lists covering three types of wrecking bars for carpenters and contractors, and for pulling down concrete forms, may be secured from Anderson Bros. Mfg. Co., Rockford, Ill.

NON-FREEZING DEPENDABLE EXPLOSIVES

The Atlas Powder Co., Wilmington, Del., will send to contractors full information on the proper type of explosives for any kind of work, as well as data on the particular value of Atlas non-freezing explosives for winter work.

GRADER SCARIFIERS

In general catalog No. 21 F, issued by the Austin-Western Road Machinery Co., Chicago, Ill., contractors will find a great deal of information covering all types of road machines, particularly graders and grader scarifiers for road work.

HEAVY-DUTY ROAD TRUCKS

The Autocar Co., Ardmore, Pa., will send full descriptive literature covering its standard 1½-, 2- and 5-ton heavy-duty trucks to any interested contractor desiring data on motor trucks for 1922 road work.

CUT GRADING COSTS

With the aid of the Maney self-loading scraper made by the Baker Manufacturing Co., 503 Stanford Ave., Springfield, Ill., road and excavating contractors can cut their dirt-handling costs. Information will be found in the Baker illustrated catalogs.

ONE-MAN EXCAVATORS

A light-weight, low-priced digger for quarry and gravel pits, highway work, small trenches, etc., is described in detail in literature of the Bay City Dredge Works, 2622 Centre Ave., Bay City, Mich.

A ROAD ROLLER CATALOG

The Buffalo-Springfield Roller Co., Springfield, O., in its catalog A, gives complete information regarding Buffalo-Pitts and Kelly-Springfield steam and motor rollers with and without scarifier attachments.

STONE LOADERS AND SPREADERS

The literature of the Burch Plow Works Co., 111 Bucyrus St., Crestline, O., contains details regarding the complete line of Burch wagon loaders, wheel-barrow loaders and stone spreaders for progressive road contractors.

GASOLINE POWER UNITS

Contractors desiring a dependable gasoline power unit for emergencies or steady work should secure the catalog of the Climax Engineering Co., Clinton, Ia., describing its 50-horse-power Climax TU gasoline engine.

MOTOR ROAD ROLLERS

The literature of the Acme Road Machinery Co., Frankfort, N. Y., describes in detail the new Acme four-cylinder road roller with air-pressure controlled scarifier.

CAST IRON PIPE AND FITTINGS

The descriptive literature of the United States Cast Iron Pipe and Foundry Co., Burlington, N. J., covers all types of cast iron pipe, both bell-and-spigot and flanged for water-mains, steam and gas-mains, as well as fittings and special castings.

DUMPING EQUIPMENT FOR TRUCKS

In a new 6-page circular, No. 115, the Heil Co., 1243 26th Ave., Milwaukee, Wis., describes in detail Heil dumping equipment for motor trucks in the service of street departments and contractors.

AIR DRILLS, HOISTS AND PORTABLE COMPRESSORS

Illustrated literature telling exactly why Waugh drills, sharpeners, hoists and portable compressors are valuable to the contractor on rough excavation work may be secured from the Denver Rock Drill Mfg. Co., Denver, Colo.

PAINT FOR STEEL STRUCTURES

Booklet No. 148 B, issued by the Joseph Dixon Crucible Co., Jersey City, N. J., contains information regarding the great length of service of Dixon Silica Graphite paint and its value for painting structural steel and other exposed metal surfaces.

HOISTS FOR EVERY SERVICE

Both steam and electric hoists of every description for all kinds of service are listed and illustrated in the Flory catalog, which may be secured from the S. Flory Mfg. Co., Bangor, Pa.

A COMPLETE ROAD MACHINERY LINE

Contractors interested in the products of a manufacturer with a widespread service department, organized especially for road contractors, may secure the catalog of the Gallion Iron Works and Manufacturing Co., Gallion, O.

A ONE-TON DUMP TRUCK

Full details of the new GMC one-ton dump truck built especially for road builders may be secured by writing to the General Motors Truck Co., Pontiac, Mich.

GRADERS, CRUSHERS AND ROLLERS

These are three of the featured pieces of road machinery listed in the catalog, "Everything for the Road Maker," which may be secured from the Good Roads Machinery Co., Kennett Square, Pa.

WAGON LOADERS AND CONVEYORS

The George Haisa Manufacturing Co., 142nd St. and Park Ave., New York City, will send to any interested contractor its literature on Haisa wagon loaders and conveyors, designed particularly for the handling of gravel, crushed stone, rock, sand, brick, etc.

TRACTORS FOR GRADING

Examples of the value of Holt "Caterpillar" tractors for hauling scrapers and for all kinds of road work may be secured from the Holt Manufacturing Co., Inc., Peoria, Ill.

ROAD ROLLERS AND TRACTORS

The Huber Manufacturing Co., 803 Center St., Marion, O., will send to any contractor full details regarding the Huber road roller and the Huber tractor, which are especially adapted for road work.

CRAWLING TRACTOR CRANES

Catalog No. 113, issued by Industrial Works, Bay City, Mich., describes in detail the new type BC Industrial crawling tractor crane, which is especially adapted to the needs of road contractors, gravel, sand and stone producers, etc.

ASPHALT DISTRIBUTORS

The Kinney Manufacturing Co., 3529 Washington St., Boston, Mass., manufacturers of auto heaters and distributors for applying bituminous materials to roads, will send catalogs to anyone interested.

SEWER AND CULVERT PIPE

The Delaware Clay Products Co., 807 Westinghouse Bldg., Pittsburgh, Pa., stands ready to send any contractor full information and prices of Delaware sewer pipe, culvert pipe, flue lining, wall coping, drain tile, hollow tile, fire brick and fire clay.

GASOLINE-SHOVEL OUTPUT

The dependability and output of Thew gasoline shovels is described in detail in an illustrated Bulletin 601, which can be secured from the Thew Shovel Co., Lorain, O.

A NEW WOOD BLOCK FLOORING

Full information regarding a new type of wood block flooring in which the blocks are furnished in strips, dovetailed to a base, may be secured by writing to the Carter Bloxomend Flooring Co., Kansas City, Mo.

AN INSULATING MATERIAL FOR BUILDINGS

The value of Celotex, a new product for replacing lumber in insulating buildings from cold, is described in detail in literature which may be secured from the Celotex Products Co., Security Bldg., Minneapolis, Minn.

MELTING ASPHALT AND TAR

Many a contractor has regretted the purchase of cheap tar and asphalt heaters. Full information regarding first-quality, non-leakable kettles will be found in the illustrated literature of Connery & Co., Inc., 400 N. Second St., Philadelphia, Pa.

CONCRETE MIXERS FOR BUILDERS

The Wolverine concrete mixer, which is a dependable low-priced unit, is described in the literature of the Knickerbocker Co., 338 Liberty St., Jackson, Mich.

CONTRACTORS' LOCOMOTIVES

Steam locomotives for contractors' work, built to give long service at low cost, are described in detail in the literature of the H. K. Porter Co., Pittsburgh, Pa.

METAL WEAR FOR CONTRACTORS

Catalog 931 of the Rochester Can Company, 109 Hague St., Rochester, N. Y., describes in detail the complete line of Iron Horse metal ware for contractors, including galvanized cans, pails, rubbish cans, engineers' cans, oily waste cans, etc.

FULL-LOAD CLAM-SHELL BUCKETS

Complete data on type "Q" Owen buckets, which take a full load at every trip, may be secured from the Owen Bucket Co., 418 Kirby Bldg., Cleveland, Ohio.

FULL-CIRCLE AUTO CRANES

The Byers Machine Co., 480 Sycamore St., Ravenna, O., will send a copy of its latest literature to contractors interested in the possibilities of full-circle auto cranes for all types of contracting work.

TAKE THE BUCKLE OUT OF ROADS

The value of Carey Elastite expansion joints in preventing the buckling of concrete, brick, wood and other types of hard-surfaced roads is described in detail in literature which may be secured from the Philip Carey Co., 9 Wayne Ave., Lockland, Cincinnati, O.

COST FIGURES ON STEAM SHOVELS

In Bulletin 8-26-H, the Ball Engine Co., Erie, Pa., manufacturers of Erie steam shovels, gives interesting cost figures on the use of steam shovels for road and street grading.

PORTABLE PUMPS FOR PAVERS

In literature which may be secured from A. C. Saxe, Sales Manager, Barnes Manufacturing Co., Mansfield, O., paving contractors will find much of interest regarding Barnes convertible power diaphragm pumps, which have been used on many successful concrete paving contracts.

EXPANSION JOINTS OF PURE ASPHALT

Asphalt expansion joints made from pure asphalt for monolithic pavements to give maximum efficiency are described in the literature of the Pioneer Asphalt Co., Lawrenceville, Ill.

CONTRACTORS' SHOVELS

Prices and descriptive literature covering Pittsburgh road contractors' shovels may be secured gratis from the Pittsburgh Shovel Co., Oliver Bldg., Pittsburgh, Pa.

NON-CORRODING WATER METERS

Descriptive literature covering the new Trident water meters with oil-enclosed gear trains may be secured from the Neptune Meter Co., 50 East 42nd St., New York City.

CORRUGATED CULVERTS

The illustrated literature of the Newport Culvert Co., 542 W. Tenth St., Newport, Ky., describing in detail Newport corrugated metal culverts made of pure iron copper alloy, may be secured free on request.

EXPANSION JOINTS FOR PAVEMENTS

The literature of the Waring-Underwood Co., Fernwood, Pa., describes the Ideal expansion joint for protecting improved pavements from buckling by expansion during hot weather.

WARRENITE ROAD CONSTRUCTION

Warren Brothers Co., Cambridge St., Boston, Mass., will send to any interested officials and contractors its illustrated booklet on Warrenite bitulithic for roads and resurfacing.

CONVEYORS FOR CONTRACTORS

Instructive catalogs describing the complete line of apron, belt, drag, chain conveyors, bucket elevators, storage plants, stone crushers, etc., made by the Weller Manufacturing Co., 1820-1856 N. Kostner Ave., Chicago, Ill., may be secured free on request.

GRADERS AND ELEVATING GRADERS

The catalog of the Russell Grader Manufacturing Co., Minneapolis, Minn., describes in detail the various sizes of road graders and elevating graders, as well as scarifiers, planers, finishers, dump-wagons, etc., made by this company.

CONTRACTORS' CRANES AND DERRICKS

The Terry Manufacturing Co., Grand Central Terminal, New York City, makers of Terry cranes and derricks for all types of contracting work, will send complete descriptive literature free on request.

ASPHALTIC CONCRETE PAVING

The Asphalt Sales Dept., The Texas Co., 17 Battery Pl., New York City, has prepared an interesting contribution to asphalt paving literature describing asphaltic concrete pavements, road oil and its uses.

CURE BARS

The Advertising Department, Truscon Steel Co., Detroit, Mich., will send its literature describing Truscon curb bars, made particularly to protect and reinforce concrete curbs, to interested builders.

PORTABLE PRESSURE PUMPS

Full information regarding a portable pressure pump for highway or other isolated construction work, capable of delivering between 1,700 and 4,500 gallons of water per hour at a pressure varying from 80 to 200 pounds, will be found in Bulletin 103 C, which may be secured from the Chalmers Pump & Mfg. Co., Lima, O.

AN EXCAVATOR WITH EIGHT ATTACHMENTS

Pawling & Harnischfeger Co., Milwaukee, Wis., will send a novel piece of printed literature to any municipal official or contractor interested, showing the P & H excavator crane with its eight different attachments.

CONSTRUCTION CONCRETE MIXERS

In a well-prepared 95-page booklet, Catalog No. 22CE, the Koehring Co., Milwaukee, Wis., describes in detail the remixing principles of Koehring mixers, as well as their mechanical features and advantages.

ASPHALT PAVING MACHINERY

Circular 1, issued by the Ingoquois Dept. of the Barber Asphalt Co., Land Title Bldg., Philadelphia, Pa., contains a number of illustrations and printed matter covering the complete line of semi-portable and portable asphalt plants, steam melting kettles and paving tools.

PNEUMATIC TOOLS FOR ROAD WORK

In a well-written illustrated Booklet 1015, "Compressed Air for the Road Builder," the Ingersoll-Rand Co., 11 Broadway, New York City, describes in detail the use of pneumatic equipment for all kinds of road work and associated industries.

TRACTORS AS CONTRACTORS' AIDS

The Cleveland Tractor Co., 19211 Euclid Ave., Cleveland, O., will send detailed information to contractors interested in the usefulness of a medium-weight tractor in all kinds of contracting operations.

ASPHALT PAVING EQUIPMENT

The literature of Littleford Bros., 500 East Pearl St., Cincinnati, O., describes in detail its tar and asphalt heaters, pouring pots and asphalt paving tools.

CAST IRON WATER-MAINS

Cast iron pipe made in 6-foot lengths which can be laid in a narrow trench without calking is described in the Universal cast iron pipe literature of the Central Foundry Co., 90 West St., New York City.

CONTRACTORS' JACKS

Jacks made in sizes from 15 to 100 tons with 24-inch handles providing ample leverage are described in the Doughboy Jack Bulletin No. 29, which may be secured from the McKiernan-Terry Drill Co., 19 Park Row, New York City.

CONTRACTORS', ENGINEERS' AND MANUFACTURERS' NOTES

GMC Reduces Prices

The General Motors Truck Company, Pontiac, Mich., has announced substantial reductions in its heavy-duty trucks, beginning January 1, 1922. The new prices represent a reduction of from \$625 to \$1,050 per chassis. In announcing the reduction, W. L. Day, President and General Manager of the General Motors Truck Company, said: "These new prices are in keeping with the spirit of the times. There is greater need to-day for economical, efficient motor transportation than perhaps ever before; in fact, it is vitally essential to the future stability of business."

H. A. Neill, for the last five years manager of the Philadelphia branch of the General Motors Truck Company, Pontiac, Mich., has been transferred recently to the factory sales staff. Mr. Neill's promotion follows a long connection with this company. Before he was assigned to the Philadelphia branch, he was special sales representative in several other territories, and for a time was manager of the factory branch in Kansas City.

F. B. Tyler succeeds Mr. Neill as branch manager in Philadelphia. He has been connected with the sale of GMC trucks in the Philadelphia territory for several years.

Manufacturer Inaugurates Five-Day Week

Announcement has been made by M. E. Gray, President, Rochester Can Company, Rochester, N. Y., that, beginning January 5, 1922, the plant has been working 8¼ hours each day, closing down on Friday night for the week, allowing the men all day Saturday for recreation and enjoyment. In this way the men work the same number of hours and draw the same amount of pay, with the additional advantage of having the full day Saturday to themselves. The Rochester Can Company believes that it has been the originator of the "All Day Saturday Off" idea, at least in Rochester. This change has not been made because of a lack of orders, as the factory has been running full force and has just completed the busiest year in its history and started in 1922 on even a greater volume.

Ingersoll-Rand to Handle Rathbun Engines

The Rathbun Jones Engineering Company, Toledo, Ohio, has appointed the Ingersoll-Rand Company, New York City, general sales agents for Rathbun gas engines. The large sales organization and service department of the Ingersoll-Rand Company, combined with the fact that these gas engines are used to drive air compressors, pumps and other machinery which it manufactures, places it in a position to be of great service to users of gas engines and other machinery.

Merger of Pipe Companies

An agreement has recently been reached between the East Jersey Pipe Company, 7 Dey Street, New York City, and the Riter-Conley Company, Leedsdale, Pa., whereby Lock-Bar steel pipe, which has been exclusively controlled by the East Jersey Pipe Company since its introduction in this country in 1905, and has been hitherto manufactured by the East Jersey Pipe Company at its plant at Paterson, N. J., will hereafter be fabricated in the Pittsburgh district by the Riter-Conley Company at its Leedsdale plant. This is regarded as a step forward by both parties and will permit considerable saving in freight rates and economy in manufacturing. The sale of Lock-Bar steel pipe will continue to be exclusively in the hands of the East Jersey Pipe Company.

Hauck Moves Philadelphia Office

The Hauck Manufacturing Company, 126-134 Tenth Street, Brooklyn, N. Y., has announced the removal of its Philadelphia office to 1726 Sansome Street. Herbert Vogelsang, who has been connected with the Hauck Manufacturing Company for six years in the sale of portable oil burners, torches, furnaces, etc., will be in charge.

Barrett-Cravens Moves Factory

Barrett-Cravens Company, Chicago, Ill., announces that on April 1 it will move to its new four-story factory, recently acquired at Monroe and Throop Streets, Chicago. Its new location will give this company considerable additional space in a new and modern structure.

Company to Assist Contractors

E. A. Keeler, formerly Secretary of the New York State Association of Builders, withdrew from actual construction work on January 9 and has organized a new company, Keeler, Inc. This company aims to be helpful in the construction industry by assisting individual contractors in eliminating waste and duplicating effort. It will represent bidders for contracts and aid them in checking estimates and quantity surveys. It will also supply information of many kinds to contractors and offer advice and suggestions if desired. Its office in New York City will provide facilities for clients that are visting in the East.

Exhibit in Palestine

The American Palestine Company, 874 Broadway, New York City, is organizing an exhibit of American products and machinery in Palestine and will be glad to get in touch with American manufacturers. The exhibit is to include brick- and tile-making machinery, building machinery, iron shops, saw mills, stone quarry machinery, etc.

Contractors' Equipment at Work

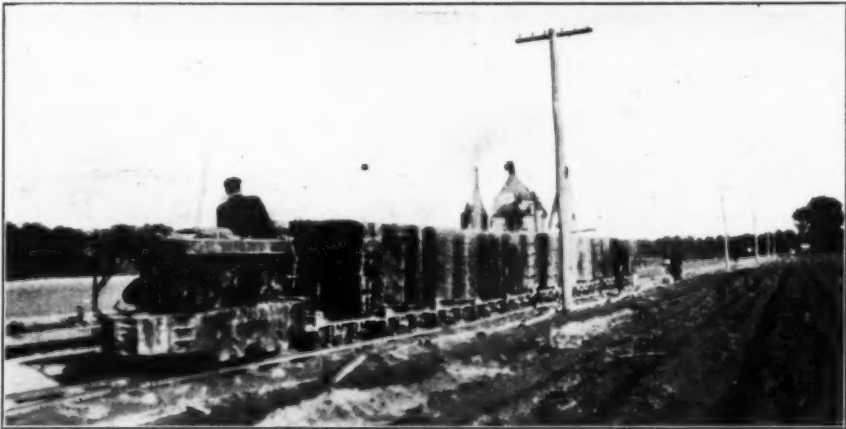


A MACK HEAVY-DUTY DUMP TRUCK FOR CONTRACTORS' SERVICE



A BYERS 10-TON REVOLVING CRANE ON SANITARY SEWER JOB, INDIANAPOLIS, IND.

This machine sold by the George W. Fife Equipment Company to the Bunting Construction Company, both of Indianapolis, is shown with pile leads hanging at the end of the crane boom driving round piling in the foundation



AN INTERESTING JOB SOLD BY THE MILLS CONTRACTORS EQUIPMENT COMPANY, CHATTANOOGA, TENN.

The equipment shown includes a Plymouth gasoline locomotive, and Western Wheeler Scraper Company trucks with Mills batch boxes



BUILDING THE NEW ST. PAUL, MINN., FILTRATION PLANT

The ground dimensions of this job are 240 x 180 feet, and there are approximately 8,800 cubic yards of concrete to be poured. The Raymer Equipment Company, St. Paul, Minn., furnished the following materials and machinery to the city for this work: One 21-5 Hansome mixer on skids, with a 15-h.p. Nove engine; complete equipment for spouting outfit on wood tower, including one 40-cubic-foot sloping back bin, one steel sliding frame, one set of boom irons, one 48-foot swivel-head chute, one 48-foot trussed swivel-head, one 48-foot untrussed swivel-head, top and bottom sheaves; twelve No. 6 Sterling concrete carts; one Koehring bar cutter; and Williamsport wire rope. O. Clausen is chief engineer, J. W. Kelsey, general superintendent, and L. M. Thompson, senior assistant for the city of St. Paul

Legal Decisions in the Contracting Field

Edited by A. L. H. Street, Attorney-at-Law

Contractor Not Responsible for Faults in Construction Plans

The plans for the construction of the new Broadway subway in New York City called for removal of a sewer from the center of that thoroughfare to a position near the building line along the street, and back of the subway wall. This involved construction of the sewer in an open vault space constituting practically a part of the Wanamaker store's sub-basement. Under pressure of heavy rainfall a section of the sewer gave way at this point and flooded part of the sub-basement. Exonerating the contractor from liability for the resulting damage, the Appellate Division of the New York Supreme Court says, in the case of John Wanamaker, New York, vs. City of New York, 189 New York Supplement, 354:

"It is not disputed that the sewer was constructed by the Dock Contractor Company in exact compliance with the plans and specifications of the Public Service Commission, and in accordance with the terms of its contract. It is not claimed that the work was done by it in a negligent manner. Any insufficiency of the sewer as constructed was directly referable to the faulty plans of the engineers or its improper maintenance by the city, for which the contractor cannot be held liable."

Enabling Contractors to Commence Operations

A contract for the construction of a public improvement implies that the authorities acting for the public body will deliver the site in readiness for commencement of the work within a reasonable time, where no time for such delivery is specified, holds a Federal court in passing upon the case of Bates & Rogers Construction Company vs. Board of County Commissioners of Cuyahoga County, Ohio. That the public authorities may assent to an extension of the time for completion of the contract work, to cover a period of delay in delivering the site to the contractor, will not avoid liability for damage resulting from the delay.

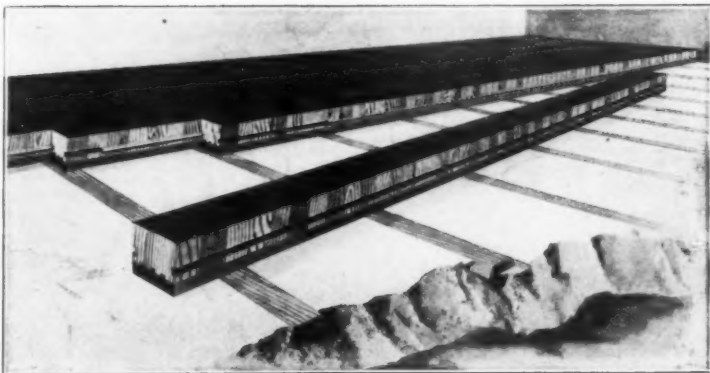
The work involved under the contract in suit consisted in the construction of bridge approaches in Cleveland.

The decision is amply supported by judicial precedents which establish as a general rule of law the proposition that a contractor, whether under a private or a public contract, aggrieved by the opposite party's default whereby performance is delayed or made more burdensome, has a valid claim for damages. In fact, it seems that a material delay in delivering a site would justify the contractor in rescinding the agreement.

In the case of Blanchard vs. Blackstone, 102 Mass., 343, the Massachusetts Supreme Judicial Court decided that where a town unreasonably delayed designation of the site for a public building the builder who had contracted to erect it was entitled to damages ensuing in consequence.

Understanding Implied as Conditions in Building Contracts

"In every building contract which contains no express covenants on the subjects there are implied covenants to the effect that the contractor shall be permitted to proceed with the construction of the building in accordance with the other terms of the contract without interference by the owner, and that he shall be given such possession of the premises as will enable him to adequately carry on the construction and complete the work agreed upon. Such terms are necessarily implied from the very nature of the contract, and a failure to observe them, not consented to by the contractor, constitutes a breach of the contract on the part of the owner entitling the contractor to rescind, although it may not amount to a technical prevention of performance." It was so declared by the California Supreme Court in the case of Gray vs. Bekins, 199 Pacific Reporter, 767.



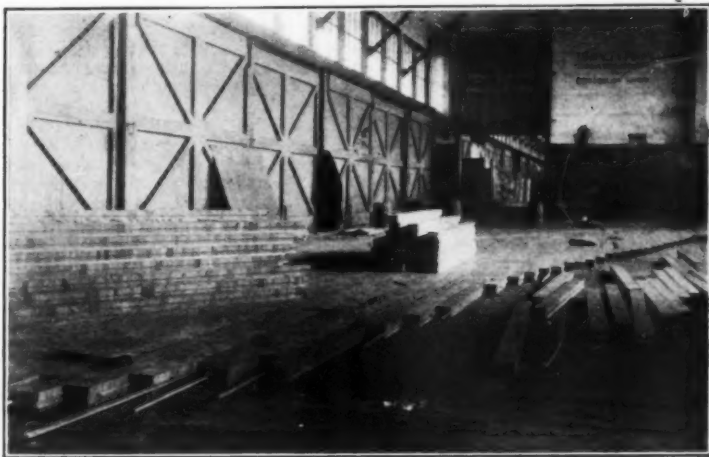
INSTALLING STRIPS OF WOOD BLOCK FLOORING

A New Type of Wood Block Flooring

IT is a well-known fact that wood blocks on end will withstand hard wear almost indefinitely. A good example of this is the wood paving blocks used on our best streets. There have been apparent failures of some of these, but invariably such failures were not of the blocks themselves, but because of poor treatment, poor foundation, or both. While loose blocks are ideal for street use, and in factories, industrial schools, shops and buildings, where heavy service floors of lasting smoothness are needed, they will not serve, because, not being securely fastened, they will work up from their bed under changing conditions and soon result in an uneven floor with

wide joints and rough surfaces.

Bloxonend, made by the Carter Bloxonend Flooring Company, Kansas City, Mo., overcomes these objections and combines the wearing quality of a paving block with the smoothness of a matched floor. In the process of manufacture approximately 48 blocks of Southern pine measuring 2 by 3½ inches and 2 inches thick are dovetailed endwise onto 1-inch carrying boards 3½ inches wide by 8 feet long. The sections or units so assembled are then trimmed, finished to a uniform height and grooved in the sides. On the job, every section of Bloxonend is linked to its parallel section by slip tongues, making a floor that is resilient and



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**A BLOXONEND FLOOR IN THROUGH BAGGAGE ROOM, UNION STATION,
KANSAS CITY, MO.**

comfortable for the workmen and one that stays smooth.

The dovetailing of the blocks to base-boards, so that Bloxonend comes from the factory in built-up strips, not only eliminates the tedious and expensive laying of single blocks on the job, but makes it possible to use Bloxonend anywhere that a plank flooring may be laid; that is, the sections may be toe-nailed to the subfloor or laid directly on joists where the spacing is suitable for the loading to be encountered. In slab floor construction, the sections may be toe-nailed to bevelled sleepers imbedded in the concrete, or toe-nailed to 1-inch strips laid close on neat slab.

The adaptability of this flooring to all locations where heavy service requirements demand such a floor is quite apparent. To meet conditions where imbedded sleepers or nailing strips are objectionable or in places where the saving in ceiling height is desirable, as over old floor surfaces, a method has been devised for laying it by lateral nailing. In this case, it comes to the job bored and with the nails partly countersunk, ready to be driven through the spline into adjoining sections. The lateral boring is through the block from one spline groove to the other, each hole being 5/16-inch

in diameter, for a depth of 1 3/4 inches with a 5/32-inch hole far enough beyond to accurately center the nail. This leaves enough wood for the nail to penetrate when it is being set for shipment to hold it firmly in place until it is finally driven home in the finished floor. For lateral nailing an especially constructed tool is furnished which enables the nailer to drive the nails home with a light sledge and in an upright position. By the use of this device one man will nail 200 square feet per hour.

Bloxonend flooring has been used for a variety of services. It has been installed in many of the country's leading industrial plants and is being specified extensively for vocational schools. A number of the leading trunk line railroads have adopted it as standard heavy service flooring for machine shops, freight houses, locomotive shops and other surfaces subjected to heavy trucking or concentrated foot-wear. An interesting development has been carried out on the Chicago, Milwaukee & St. Paul Railway, in the use of this flooring in baggage and express cars. Cars so equipped have been in service for three years without damage or repairs to floors, and Bloxonend has now been adopted as standard flooring for this work.

Book Reviews

DRAINAGE AND SANITATION

E. H. Blake, Vice-President, Institution of Sanitary Engineers, London, England. D. Van Nostrand Company, New York City. 1921. Second Edition, XII + 519 pp. 379 illustrations. \$4.50.

An interesting book on domestic sanitation, including the planning, construction, and prevention of dampness in buildings; their ventilation, heating and lighting, and water-supply; sanitary fittings and waste pipe; exterior and interior drainage; sewage disposal; the materials used in sanitary work; sanitary surveys and reports; refuse disposal; disinfection and smoke abatement. There is also a chapter of legal notes regarding statutory enactments governing sanitary matters in England.

PLUMBING PICTURE TRAPS—VENTED AND UNVENTED TRAPS

A. E. Hansen, Hydraulic and Sanitary Engineer, 2 Rector Street, New York, Author and Publisher. 1921. 83 pp. Illustrated. \$2.

This book has been prepared as the result of an historical, statistical and experimental engineering research on vented and unvented traps. It gives a very detailed discussion of the history, uses and value of the various types of traps in use in the United States to-day. Tables are included showing the types of traps permitted in different cities. The book is particularly valuable for the plumbing contractor or municipal official.

The Knickerbocker Theatre Disaster— A Warning

FROM the numerous investigations and reports on the causes of the collapse of the roof of the Knickerbocker Theatre, Washington, D. C., on January 28, the general conclusion is that the building gradually wedged itself apart during the four years since its erection. Whether expansion of the trusses or the vibration caused by the almost continuous passage of heavy street cars was the cause will never be known. If the structure had been tied

securely, this disaster might have been prevented, but undoubtedly in the flimsy construction of the walls lies the chief cause of their failure.

Contractors will do well to carefully check the designs of all structures they bid on, to make sure that all parts of the structure are properly designed, thus removing from the contractors the possibility of the stigma of a failure. It is not advantageous to be the builder of an unsuccessful building.



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GENERAL VIEW OF THE KNICKERBOCKER THEATRE RUINS

Road Building by Tractor

The Economy of Machines Over Horse-drawn Equipment Is Acknowledged

THE tractor is fast taking the place of animal power in road building and road maintenance work. It has proved a big time-saver, not to mention the fact that a tractor can be operated continuously without a rest,

constructed of good materials. They are built compactly, are easy to handle, and have sufficient reserve power to respond to unusual demands.

In the handling of elevating graders, scarifiers, levelers, graders, plows, chisels and other implements used for road construction and maintenance, the Best tractor has many records for unusual service. One illustration herewith shows a tractor hauling a long line of wide-wheeled tractors loaded with gravel for a highway job. Another depicts one of these machines hauling a blade grader on a road job in North Carolina, easily piling up the dirt from the ditch onto the crown of the road. In the clearing of land for road or agricultural purposes, this tractor has pulled out

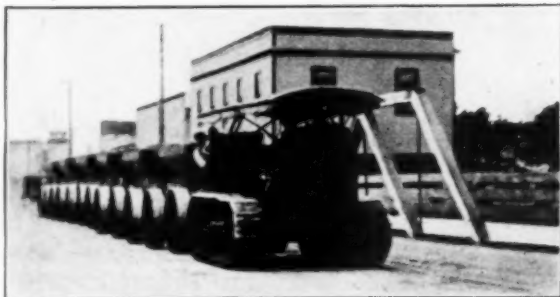


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with less help, and over ground conditions impossible to negotiate with animal power. The special advantages claimed for the Best Track-layer Tractor made by the C. L. Best Tractor Company, San Leandro, Calif., are that it has dependable, flexible power, giving the road-building contractor, the highway engineer or street supervisor the assurance that the tractor will handle the job at hand without a hitch. These tractors are built for heavy-duty service and are necessarily



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thousands of stumps and put the ground in good shape to quickly respond to the elevating or blade grader.

The Best "30" tractor, which is used quite extensively in road work, is equipped with a 4-cycle, 4-cylinder, water-cooled, valve-in-head motor, with $4\frac{3}{4}$ -stroke. It is rated at 30 horse-power at 800 r.p.m. The speed of the tractor on high is $3\frac{1}{16}$ miles per hour, 2 miles per hour on low, and $2\frac{1}{2}$ miles per hour reverse.



CLEARING LAND IN CALIFORNIA

A New Gasoline Revolving Shovel

IN accordance with the advance in the use of the gasoline engine as a power-plant unit for contracting machinery, the Bucyrus Company, South Milwaukee, Wis., has announced that it is manufacturing gasoline-operated shovels with no engine, motors, shafts, chains or gears on the boom, and yet with an actual digging power greater than that of a steam shovel of the same size. This innovation in the manufacture of excavating machinery is known as the Bucyrus 30-B gasoline shovel. For more than ten years Bucyrus drag-line excavators have been operated by gasoline engines, but the application of this power to the revolving shovel involved more difficult and intricate problems, chief among them being the efficient transmission of power to the thrust without excessive compli-

cations in design, and the obtaining of digging power commensurate with that of a steam shovel of similar size.

The company claims to have satisfactorily solved these problems in the new shovel, and also to have obtained the digging characteristics of the steam shovel with its quick reversals, its powerful thrust of the dipper and its dependability.

Before being put on the market this shovel was used for a period of six months for over-casting and loading dump-cars in sticky clay, for grading a concrete road where the cut averaged 5 inches in old macadam, and for stripping a stone quarry and loading trucks in a stiff hardpan containing many boulders.

The outstanding features claimed for this



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shovel by the manufacturers may be summarized as follows: It is claimed to be simpler than a steam, electric or other type of gasoline shovel and has fewer parts to maintain and keep in order. It has all the well-known performance characteristics of the steam shovel, even to the shaking of the dipper to relieve it of sticky material. It is claimed that this shovel will give 20 per cent greater yardage per gallon of gasoline than an electric shovel of equal power, or any other type of gasoline shovel, because of the reduction of mechanical losses and waste energy.

The gasoline engine with which this shovel is

equipped is twice as heavy as the usual type of commercial gasoline engine sold for this purpose. It is designed especially for this shovel from specifications offered by the engineers of the manufacturer, and is consequently suited for the exacting requirements of this unusually severe service. The engine is entirely enclosed and dust-proof. It is a four-cylinder, slow-speed type and will develop 55 horse-power at a speed of 400 r.p.m. The shovel carries a 1-cubic-yard dipper and may be equipped as a drag-line excavator, a crane or a clam-shell machine, with simple changes which may readily be made in the field.

Equipment versus Hand Labor

Saves \$52 Per Day on Pipe Reclamation Job

BY the use of equipment on a job so small that ordinarily the contractor would employ hand labor, Q. J. Winsor of Elyria, Ohio, saved \$52 a day on a small water-main reclamation job.

Mr. Winsor describes the job and his method of handling it as follows:

A saving of \$52 a day was made on a small water-main reclamation job, because the superintendent found available a small crane and put it to work, instead of digging the pipe out by hand.

About 300 feet of cast iron pipe, which had been in the ground 15 years, had been cut out of the present water-supply system, and the city thought it was worth salvaging. This pipe lay under an old water-bound macadam road at a depth of about 6 feet in soil that had become the hardest kind of hard clay.

No Excavating Equipment

As the city had no excavating equipment of its own and the job was very small, the usual thing would have been to dig it out with pick and shovel. In this case the superintendent happened to hear of a light crane that could be hauled quickly to the job behind a motor truck, and decided to try it out.

The crane had wide steel traction wheels, and was towed the two miles to the job behind a 3-ton truck, the trip taking about 45 minutes.

The equipment was a half-yard excavating bucket, reaved to get the greatest closing

power and equipped with teeth. The bucket had to dig through about 8 inches of macadam before it struck the hard clay. No trouble was experienced in doing this, and fair loads of clay were taken out each trip. The trench was made just the width of the bucket, and after it got down about 6 feet digging became a little slower, as the bucket did not dig sufficient side clearance to allow it to drop readily.

Care had to be taken as the bucket approached the pipe, so as not to break it, but this did not slow up the work much. No pipes were broken, and the bucket cleaned out clear to them, so that all the shovel work necessary was to dig out the joints.

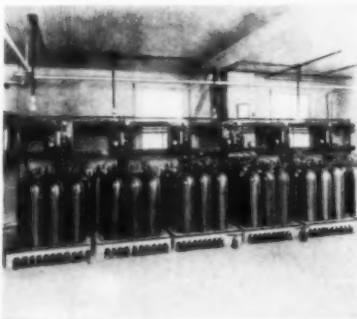
The trench was dug 3 feet wide and from 6 to 7 feet deep. The total time taken was a day and a half, though two days were counted to allow for getting the crane to and from the job.

The superintendent said of this job that, at the rate his men were working on other and previous jobs, the crane took the place of about 16 men. He was paying a regular rate of 50 cents an hour; so, figured on a 9-hour day basis, without the crane the job would have cost \$144. With the crane costing \$20 a day, including operator and fuel, the cost was \$40, which, deducted from \$144, leaves a net saving of \$104, or \$52 a day.

It is probable that similar savings may be made on many small jobs, particularly now that there is a large amount of idle equipment that might as well be used.

—A. G. C. Bulletin.

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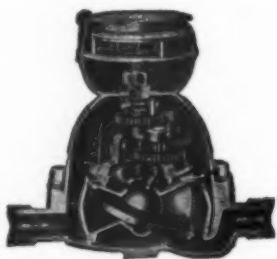
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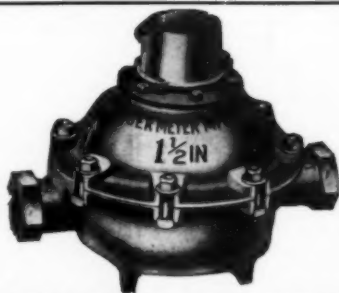
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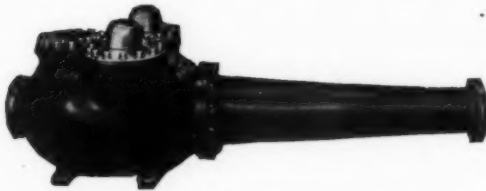
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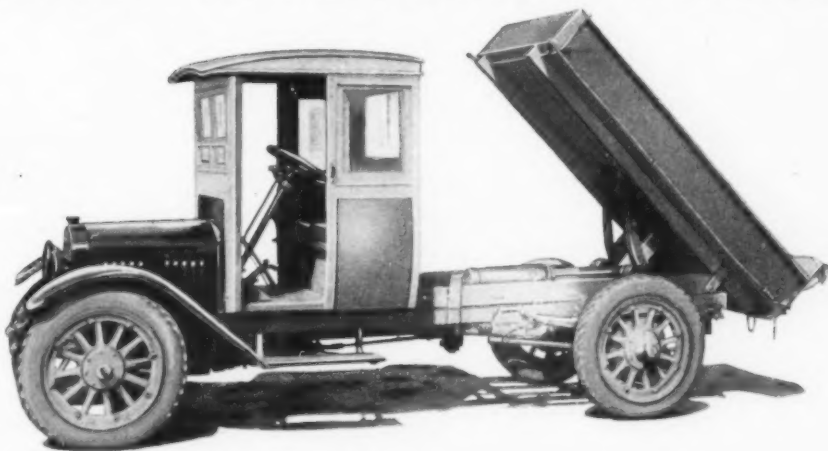
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The 3-unit plant—shown above—is made in three sizes. Guaranteed capacities—800, 1250 and 1850 sq. yards of 2-inch sheet asphalt topping per day. **Actual productions—40 to 75 per cent greater.**

Iroquois Asphalt Mixing Plants are portable or stationary—electric or steam driven. Each type is made to meet definite requirements. Write at once for illustrated folder.



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